MedTrain
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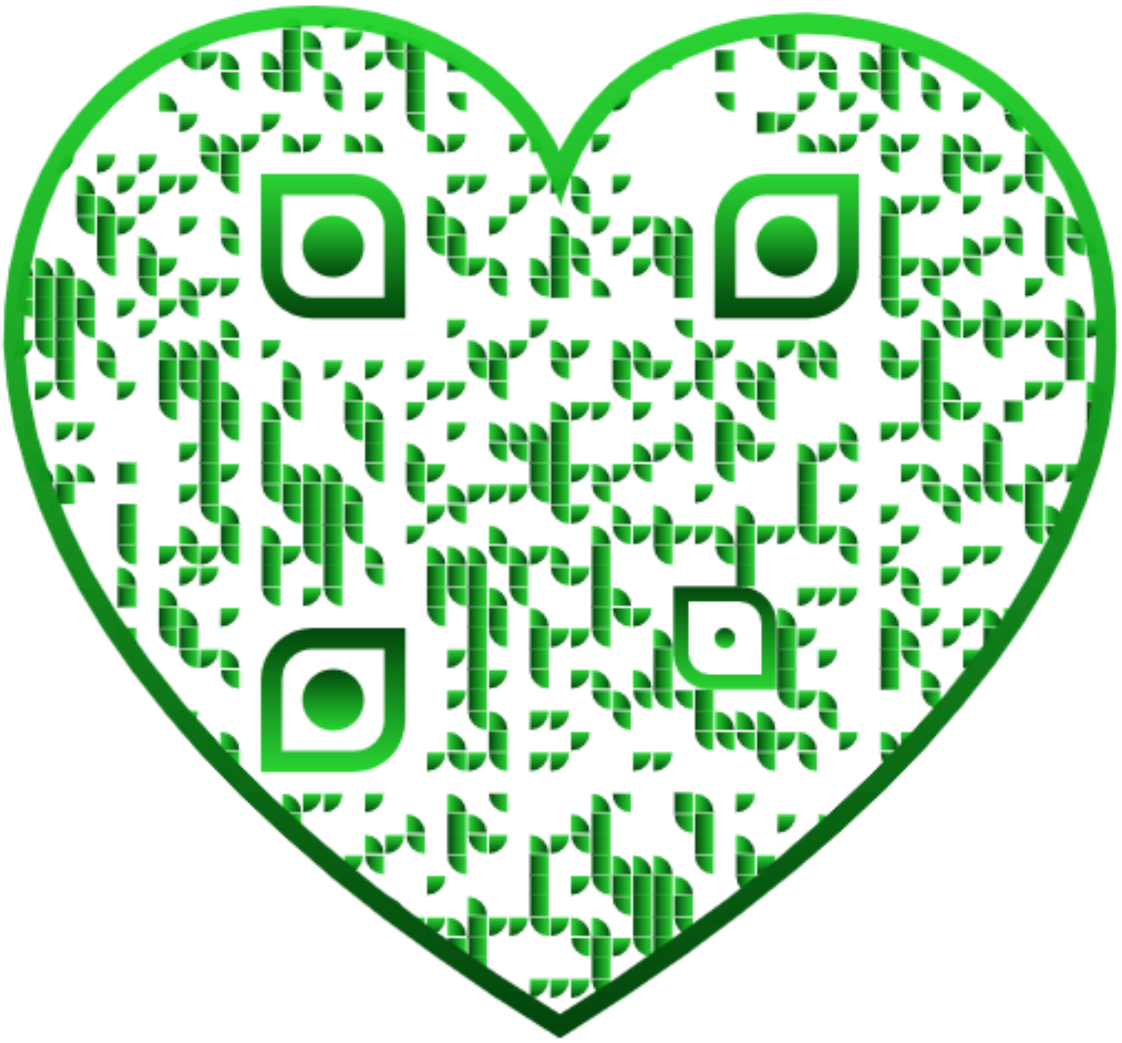
Pain management
معالجـــة الألـــم

مستشفى جامعة العلوم والتكنولوجيا
University of Science & Technology Hospital
ملتزمون بالتميّز

PAIN MANAGEMENT IN EMERGENCY DEPARTMENTS

PRESENTED BY : RASHEED



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IMPACT OF PAIN ON EMERGENCY PATIENTS

70%-80%

Pain-related complaints represent the primary concern in up to 70% of patients presenting to the emergency department (

Specific measures to treat pain should occur in addition to, and at the same time as, treatment of the underlying illness or injury

Distinguishing patient requests for medications because of oligoanalgesia from addiction often requires multiple patient assessments over time

appropriate treatment of acute severe pain should not be withheld for fear of facilitating drug misuse

IMPACT OF PAIN ON EMERGENCY PATIENTS

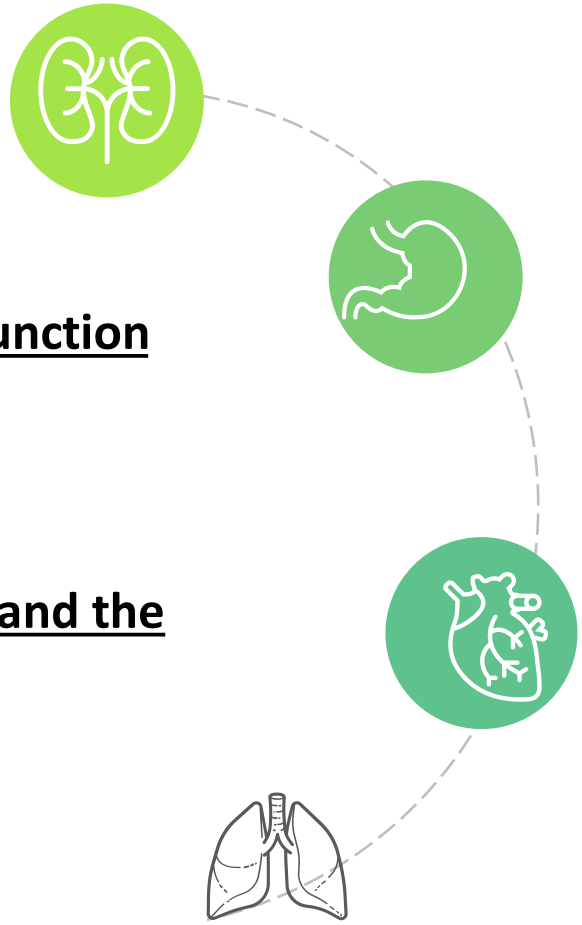
1-negative physiologic outcomes

increases in sympathetic outflow, peripheral vascular resistance,

decrease in gastric motility, and immune function impairment

increase myocardial oxygen consumption, and the production of carbon dioxide

hypercoagulability.

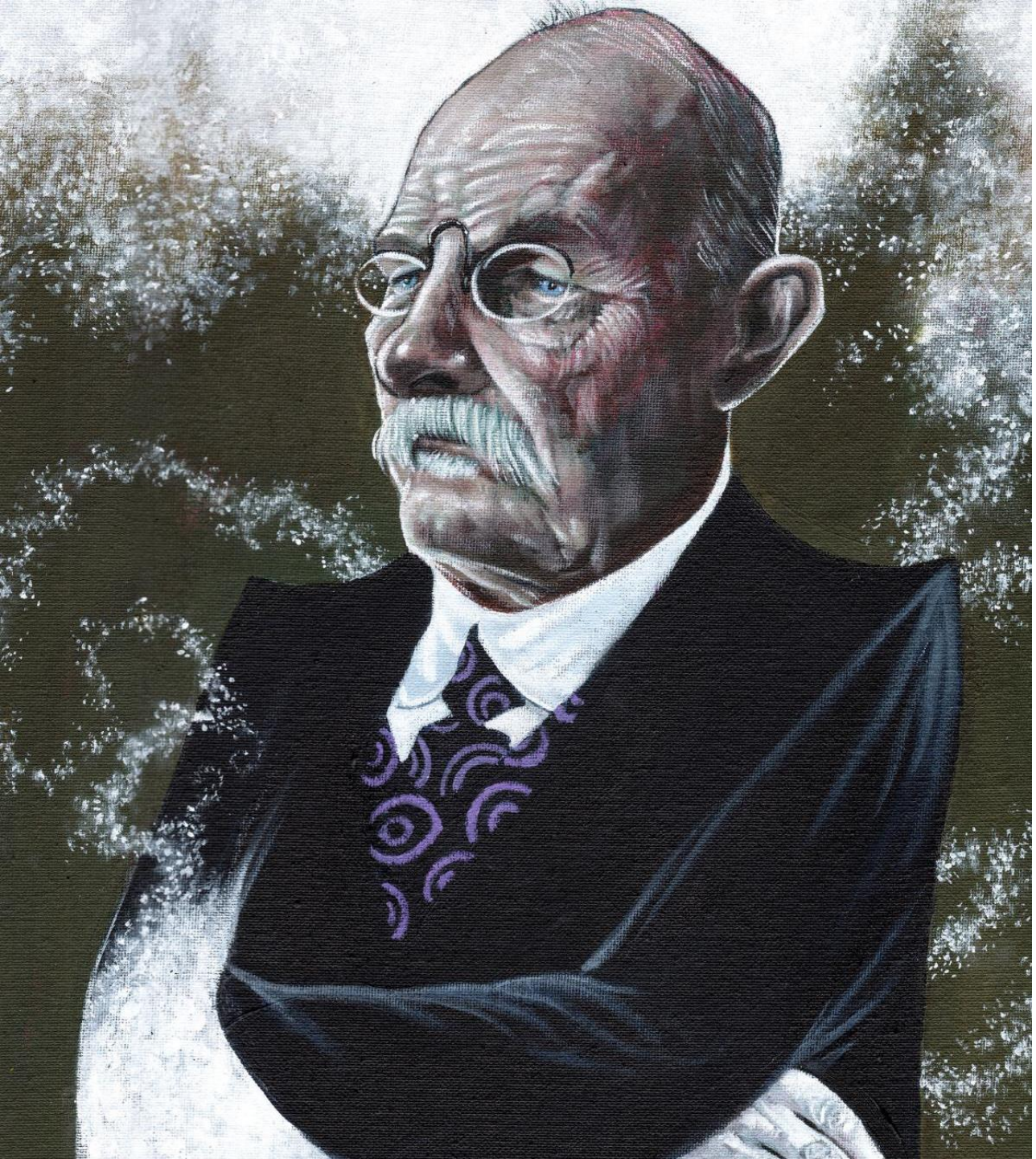


2-adverse effects of unrelieved pain

-development of chronic pain syndromes and vegetative symptoms

-increase the need for pain management during any recovery period

- Satisfaction depends on the techniques and timeliness of analgesia, as well as the discharge plans for pain relief.



“ pain, hemorrhage , infections the three great evil which has alwayes emibttered the practice of surgery”

William Halsted

Pain Measurement

Pain scores are accepted as the most accurate and reliable measure of assessing a patient's pain and response to pain treatment.

- Numeric Rating Scale
- Verbal Descriptor Scale
- Visual Analogue Scale

Pain treatment should be targeted to a goal of reducing the pain score (e.g., by 50%, below 4/10, or referred to as mild/moderate or severe) rather than a specific (maximum) analgesic dose.

Pain ASSESMENT

ask patient requires more analgesic may even be simpler and accomAplish more than using any standardized pain evaluation to

The patient’s subjective reporting of pain, not the healthcare provider’s impression, is the basis for pain assessment and treatment

Document the degree of pain on initial assessment.

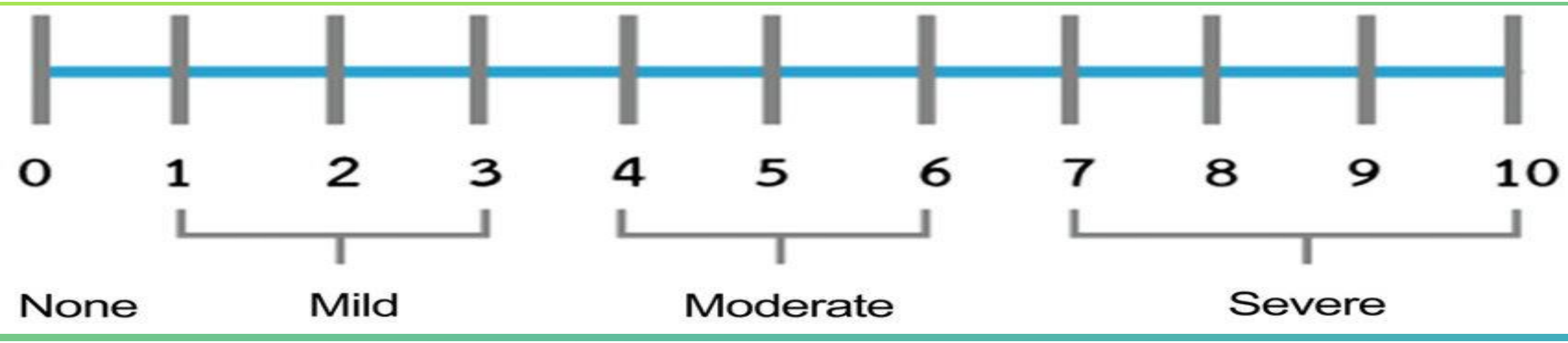
language difficulties or cross-cultural differences, the visual analog scale is the preferred pain assessment tool.

purpose of pain scales is to quantitate pain severity, guide the selection and administration of an analgesic agent, and reassess the pain response

There is a weak correlation between nonverbal signs, such as tachycardia, tachypnea, and changes in patient expression and movements, and the patient’s report of pain

Numeric Rating Scale

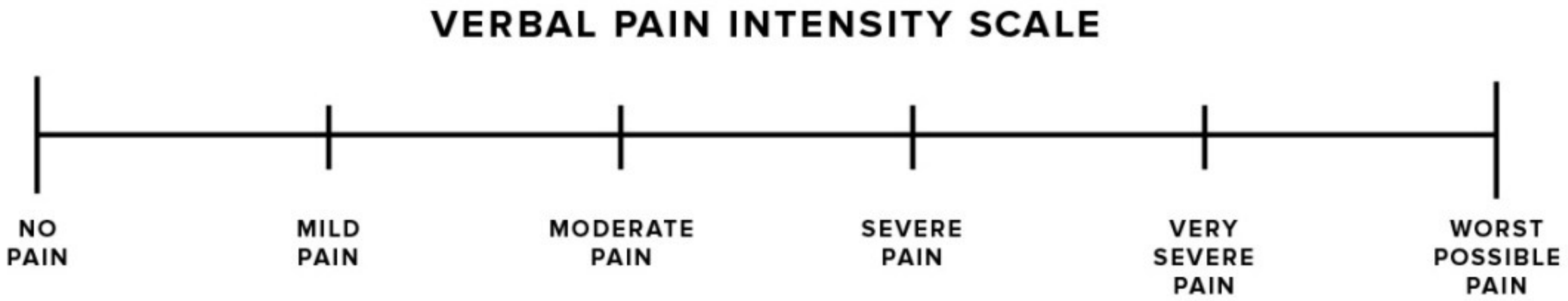
The patient is asked to self-report pain on a scale of 0 to 10 without descriptors.



Most commonly used scale; easy to administer.

Verbal Descriptor Scale

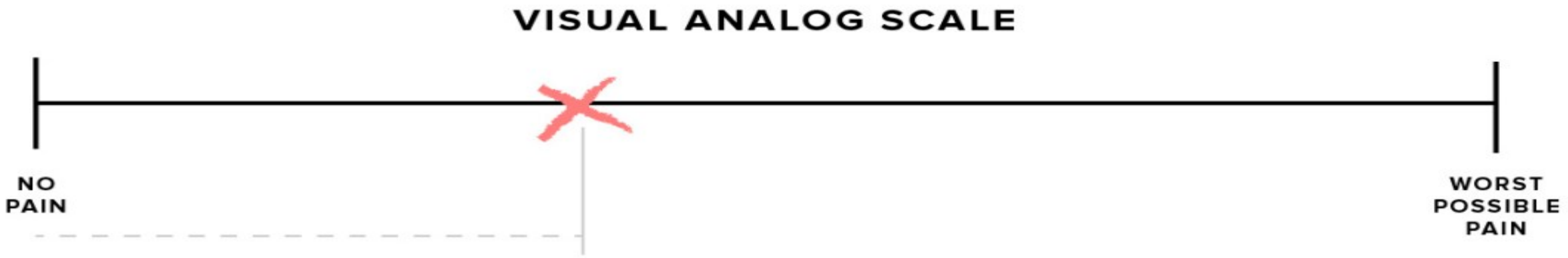
The patient is asked to self-report pain on a scale of 0 to 10 with descriptors for 0, 5, and 10.



Can be used in patients with visual, speech, or manual dexterity difficulties by using upheld fingers. Not as discriminating as the VAS.

Visual Analogue Scale

Patient places a mark that best describes pain intensity along a 10-cm linear scale marked at one end with a term such as no pain and at the other end with worst imaginable pain



Pain intensity measured in millimeters from the no-pain end. A difference of 13 mm is the minimum clinically significant change noticeable by patients, whereas an average decrease of 30 mm appears to be the minimum acceptable change for pain control.

Acute pain managment

In 1680, Sydenham wrote that "Among the remedies it has pleased Almighty God to give to man to relieve his sufferings, none is so universal and so efficacious as opium."

Centuries later, this statement is still accurate, and titrated opioids remain the therapeutic foundation for severe acute pain

Treatment Groups

The approach to patients in pain begins with a characterization of pain into **four** unique treatment groups

1. **acute pain**
2. **recurrent pain**
3. **chronic pain of malignancy and neuropathic pain**
4. **chronic pain**

ACUTE PAIN TREATMENT

acute pain may be best managed by restoring emotional control and providing information about the situation. If verbal reassurance combined with an analgesic does not suffice, an anxiolytic may be useful

The tiered approach to acute pain management unnecessarily subjects the patient to more prolonged suffering. It is preferable to select initial analgesics that are appropriate to treat the intensity (mild, moderate, or severe) of the patient's pain

Until more is known, it would be prudent to switch to a drug from a different opioid class if a patient develops a hypersensitivity reaction

Pretreatment with antiemetics is not necessary given the low risk of emesis,52 but symptom-targeted therapy is sometimes necessary.

PHARMACOLOGIC ACUTE PAIN TREATMENT

NONPHARMACOLOGIC MODALITIES

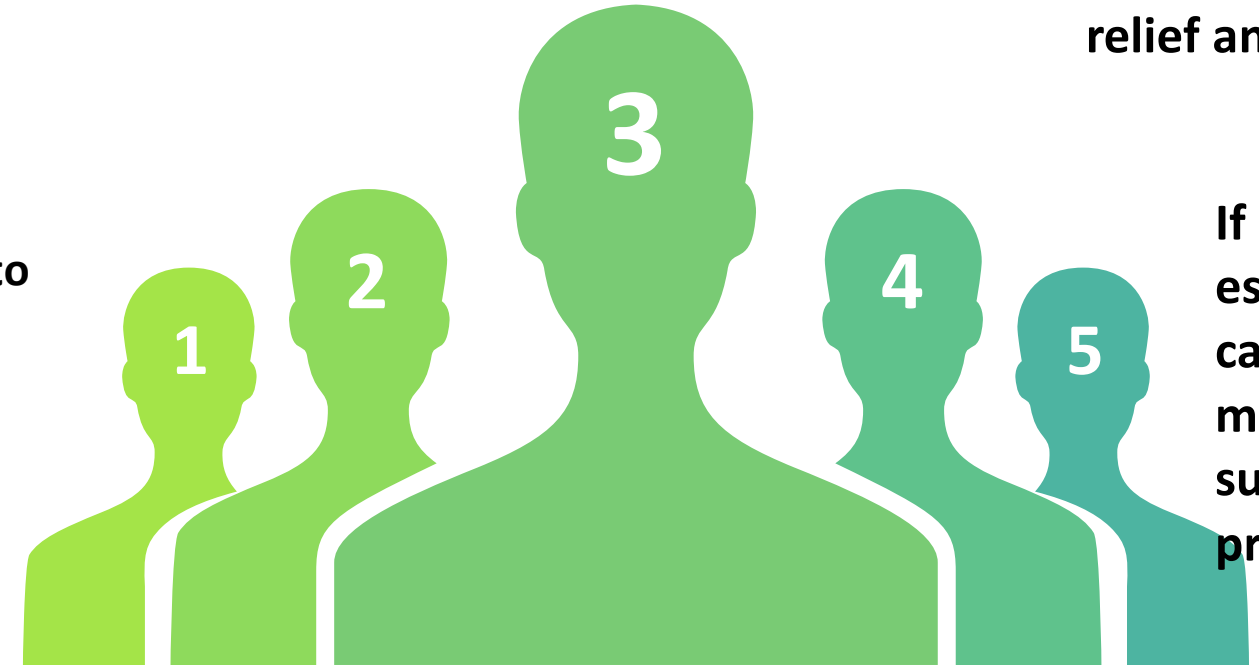
Administration of pain control

The goal of opioid administration is to attain effective analgesia with minimal adverse effects

There is no standard, fixed, or weight-related dose that will consistently produce a given clinical effect.

The correct dose that a patient requires at a particular time can only be determined by repeated assessment of the degree of pain relief and adverse effects

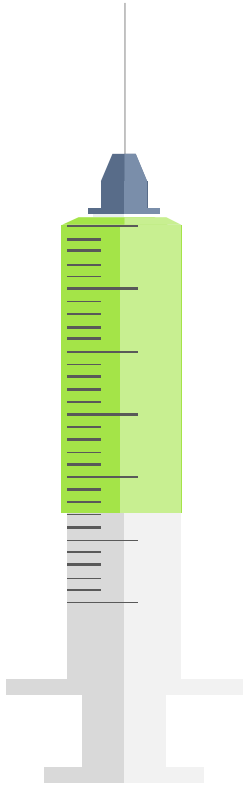
The most effective and safe way to achieve pain relief is to use a deliberate IV titration



If an IV line cannot be established, and the patient cannot tolerate PO medications, the subcutaneous (SC) route is preferable to the IM route

Pharmacologic Therapy

Opioids



Opioids are the first-line agents in the management of acute severe pain

Concerns regarding opioid toxicity or dependence and a poor understanding of the pharmacokinetics of the drugs have led to inadequate dosing and excessively infrequent dosing intervals

To prevent the overuse and misuse of opioids, the quantity and strength of the opioids prescribed should closely match the anticipated duration of the severe pain, and the patient should be transitioned off the opioid analgesia at the earliest appropriate opportunity

The optimal use of IV opioids requires administering an initial loading dose followed by an assessment of the analgesic effect. Frequent (every 5–15 minutes) repeated doses should be administered until analgesia is achieved

Morphin:

primarily metabolized by conjugation into three- and six-conjugate forms in the liver. The six-conjugate form morphine metabolite is a strong mu and delta receptor agonist

Morphine is effective by oral administration; however, only 20% of the ingested morphine dose will reach tissues after first-pass metabolism, requiring a dose adjustment approximately five times that of an equpotent IV dose

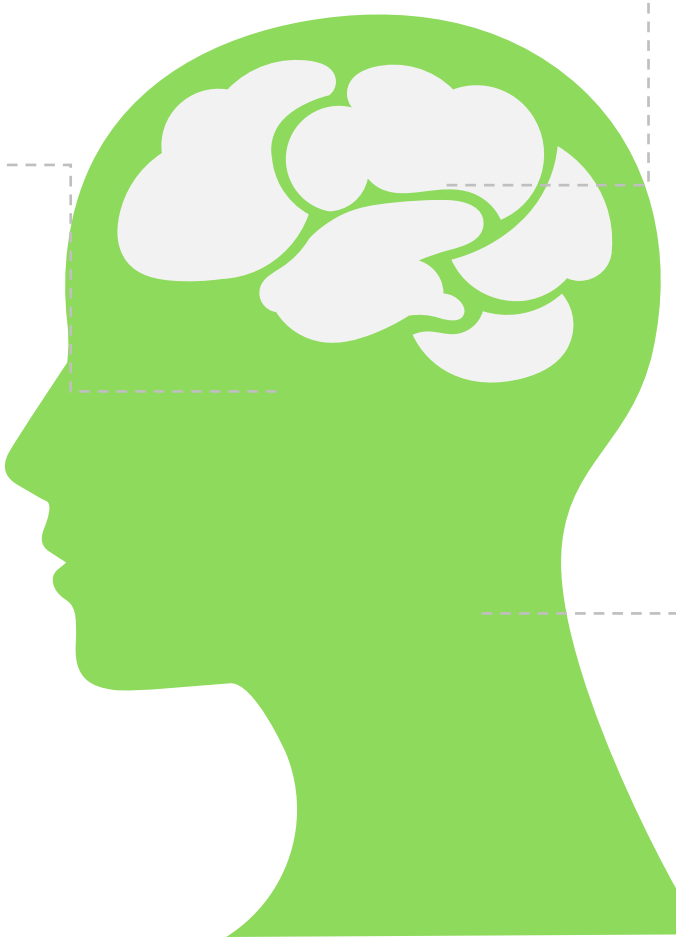
The three-conjugate form (normorphine) has no opioid analgesic activity but has been associated with CNS side effects (e.g., tremors, myoclonus, delirium, seizures) when it accumulates. This risk is greatest in older patients and those with renal insufficiency

Mechanism of action and toxic effects

work by binding to four types receptors in the spinal cord and brain three classic ones (delta, kappa, and mu, each with identified subtypes) and nociceptin.

modify pain transmission in the spinal cord and thalamus,

alter pain perception at the level of the cortex



These receptors suppress pain detection peripherally

Meperidine (Demeroland

Meperidine is not indicated for use in the ED

Meperidine (pethidine) was removed from the World Health Organization list of essential medications in 2003.

The greatest disadvantage is that it is metabolized by the cytochrome P450 system to the active metabolite, normeperidine

I.V DOSE Meperidine 0.75 mg/kg

Normeperidine can cause CNS toxicity at therapeutic meperidine doses.

Normeperidine resulting in significant anticholinergic effects, including agitation and delirium, seizures, hallucinations, and psychosis as the metabolite accumulates

Hydromorphone

Hydromorphone is a semisynthetic derivative of morphine that is a potent analgesic agent, frequently used to manage acute pain in the ED.

Hydromorphone is the P450 metabolite of hydrocodone and is approximately seven times more potent than morphine, with a similar duration of action (7 mg of morphine is roughly equivalent to 1 mg of hydromorphone.)

Hydromorphone can be given via the IV, SC, PR (per rectum), or PO rout

.Patients with renal insufficiency may be at some risk of neurotoxicity after prolonged exposure due to H3G accumulation.

Patients allergic to morphine do not consistently have cross-reactivity with hydromorphone

Fentanyl

Fentanyl is a synthetic opioid that is highly lipophilic; it produces analgesia within 1 to 2 minutes following IV infusion

The P450 system metabolizes fentanyl into inactive metabolites. Drug accumulation and toxicity may occur after tissue saturation following a prolonged infusion, but this is unlikely to occur during acute therapy

Fentanyl can be administered IV, transmucosally, or transdermally. Nebulized or intranasal fentanyl has been described to treat acute pain in patients without IV access at doses of 1–3 mcg/k

Fentanyl is more frequently associated with respiratory depression than morphine.

FOR rigid chest syndrome, usually occurs with anesthetic doses greater than 7–15 µg/kg

Oxycodone

Oxycodone is a strong opioid agonist that is highly bioavailable in an oral form

Oxycodone undergoes hepatic metabolism into oxymorphone, a strong opioid agonist that principally accounts for its analgesic effects. Approximately 10% of patients do not metabolize oxycodone well and cannot generate the functional metabolite, oxymorphone

Oxycodone is not available in a parenteral form in the United States, although studies have demonstrated its IV form to be equianalgesic to morphine. Similar to other opioids, the analgesic effects of oxycodone are dose-dependent. A 15-mg oxycodone dose has similar efficacy to 10 mg of IV morphine. The onset of action of PO oxycodone is approximately 20 to 30 minutes.

Cases of serotonin syndrome have been reported when serotonin reuptake inhibitors and oxycodone are given together, likely due to this metabolic interaction

Tramadol

lis a synthetic oral analgesic that is a weak mu agonist, with some serotonin and norepinephrine reuptake qualities. Its analgesic properties are thought to be primarily due to mu receptor agonist activity

Tramadol is metabolized in the liver by the cytochrome P450 system. One of its metabolites, M1, has a greater mu receptor affinity than tramadol and has an elimination half-life of 9 hours. Tramadol appears to affect GABA, norepinephrine, and serotonin receptors and the reuptake of the neurotransmitters. These properties may serve to activate descending pain modulation

As a selective mu agonist without kappa agonist effects, tramadol should not cause physiologic dependence, although tramadol use is associated with abuse. Tramadol should not be considered a nonaddictive alternative to opioid

The most common tramadol side effects are nausea, vomiting, dizziness, orthostatic hypotension, and sedation

Tramadol lowers the seizure threshold and therefore provokes isolated seizures in selected patients. Tramadol use along with other serotonergic medications

Buprenorphin

e is a synthetic opioid with a high affinity for the opiate receptor. Buprenorphine has no current indication for the treatment of pain. Rather, buprenorphine, either as a sole agent (Subutex) or when combined with naloxone (Suboxone), is used to reduce opioid drug cravings in patients with opiate use disorder. It has been described for the initiation of treatment for opioid use disorder in the ED.30

The combination of buprenorphine and naloxone is the most commonly used
agent with the addition of naloxone acting as an intravenous or inhalation
abuse deterrent

codein

there are case reports of neonatal deaths as a result of breastfeeding from mothers who were hypermetabolizers of codeine. In addition, the standard PO dose of 30 to 60 milligrams produces little analgesic effect above that of acetaminophen or NSAIDs alone

Acetaminophen and NSAID

Acetaminophe:

is an effective analgesic for acute mild to moderate pain, but is not effective for persistent or chronic pain

Although acetaminophen has been in use since the 1880s, its pharmacologic mechanism of action is unknown

For mild analgesia and fever reduction, acetaminophen is the first line agent

Acetaminophen is metabolized in the liver primarily through conjugation to a sulfate or glucuronide

dose of adult is 650 to 1000 mg every 4 to 6 hours, not to exceed 4000 mg/day. No increase in analgesic effect has been reported for doses greater than 650 mg

Patients with a history of salicylate hypersensitivity characterized by urticaria have an 11% cross-reactivity to acetaminophen, and the agent should be used with caution in this group

There is no consistent evidence that the combination of acetaminophen and ibuprofen is more e
agent singly for acute pain in the ED.

The analgesic effects of the combination of acetaminophen with an NSAID are additive

NSAID

No NSAID is more effective as an analgesic than ibuprofen, 400 mg, including ibuprofen doses of 600 and 800 mg

There is no consistent evidence that the combination of acetaminophen and ibuprofen is more effective than either agent singly for acute pain in the ED.

The analgesic effects of the combination of acetaminophen with an NSAID are additive

Nonsteroidal Antiinflammatory Drugs NSAIDs inhibit cyclooxygenase (COX) and, as a result, the synthesis of prostaglandin, a key mediator of inflammation

For acute pain management, ketorolac is rarely indicated in the patient able to receive oral medications, given that 60 mg of ketorolac administered IM is not clinically superior to 800 mg of oral ibuprofen

GI bleeding, renal failure, anaphylaxis, and platelet dysfunction

There is no human subject evidence that short-term use of NSAIDs for analgesia after fracture is deleterious to healing

PERCAUTIONS WHEN PRESCRIBE OPOIOD

01

choosing an appropriate initial dose and subsequently titrating additional doses

02

With comorbiditiesinitial dosing should be decreased.

03

Initial IV opioid doses in the elderly are typically half those used in younger adults

04

Consider carefully risk factors for misuse, such as concomitant mental health illness or previous drug or alcohol abuse, when prescribing opioids

05

In patients with renal failure, hydromorphone and fentanyl are the preferred opioids. Mild hepatic dysfunction has little effect on opioid metabolism..

06

Drug Interactions

The combination of opioids with benzodiazepines carries a high risk of central sleep apnea and should be used with caution.

MEDICAL POWERPOINT TEMPLATE

01 Patient inclusion/exclusion criteria

Include: patients with acute, traumatic, extremity pain AND site of injury between EITHER ankle to hip OR wrist to shoulder

Exclude: patients with chronic or recurrent pain, OR extremity pain of nontraumatic cause

02 Standardized triage assessment

- **Severity**: record pain scale assessment with 1-10 numeric rating scale
- **EMS**: record absence or treatment by EMS with analgesia agent(s) in medical record
- **Dosing and therapy:** in accordance with presence or absence of deformity and consideration of allergy
- **Ice/elevate**: Ice pack and elevation of affected extremity

03 Presence of deformity/suspected dislocation

- Place IV, saline lock; place order for patient NPO
- Notify emrgency clinician; request and confirm one of the following:

1. IV morphine 0.10 mg/kg up to 4 mg
2. IV hydromorphone 0.015 mg/kg up to 1 mg
3. IV fentanyl 2-4 µg/kg up to 100 µg
4. Absence of deformity—medications may be considered

If patient refuses IV and/or analgesia, RECORD IN MEDICAL RECORD and consider dosing and therapy in accordance with absence of deformity protocol

04 Absence of deformity

- Notify emergency clinician; request and confirm one of the following:

1. PO ibuprofen 10 mg/kg up to 600 mg
2. PO acetaminophen 15 mg/kg up to 650 mg
3. PO hydrocodone suspension 0.15 mg/kg up to 5 mg
4. PO oxycodone 0.15 mg/kg up to 5-mg tablet

If patient refuses PO analgesia, RECORD IN MEDICAL RECORD (ibuprofen not to be used in pregnant patients or patients > 70 years)

05

Standardized nursing repeat pain assessment

- Severity: record pain scale assessment with 1-10 numeric rating scale q1h
- Dosing and Therapy: in accordance with presence or absence of deformity after confirmation with emergency clinician